10 CFR 50.73

Virginia Electric And Power Company
Surry Power Station
5570 Hog Island Road
Surry, Virginia 23883

November 13, 2004

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555-0001

Serial No.: 04-401A
SPS: TJN R2
Docket No.: 50-281
License No.: DPR-37

Dear Sirs:

Pursuant to 10 CFR 50.73, Virginia Electric and Power Company hereby submits the following Supplemental Licensee Event Report applicable to Surry Power Station Unit 2.

Report No. 50-281/2004-001-01

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to the Management Safety Review Committee for its review.

Very truly yours,

Richard H. Blount,
Site Vice President
Surry Power Station

Enclosure

Commitments contained in this letter:

1. The critical CCVTs for Unit 1 will be replaced in the Fall 2004 refueling outage.

2. Other switchyard CCVTs older than 20 years will be replaced and a monitoring and scheduled replacement program will be implemented to prevent future failures.

3. An evaluation will be conducted to verify that switchyard critical components and appropriate preventive maintenance activities are identified.

4. An evaluation and/or inspection will be conducted of the coating systems applied to carbon steel and stainless steel risk significant piping which have not been previously evaluated.

IE22

Serial No.: 04-401A
Docket No.: 50-281

cc: United States Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23 T85
Atlanta, Georgia 30303-8931

Mr. N. P. Garrett
NRC Senior Resident Inspector
Surry Power Station

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0066), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
SURRY POWER STATION , UNIT 2	05000 281	1 OF 5

4. TITLE

Switchyard Device Failure Results in a Reactor Trip

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCUMENT NUMBER
05	21	2004	2004	-- 001 --	01	11	13	2004	.	05000
									FACILITY NAME	DOCUMENT NUMBER 05000

9. OPERATING MODE	N
10. POWER LEVEL	100%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)
	20.2203(a)(1)		50.36(c)(1)(i)(A)	X	50.73(a)(2)(iv)(A)		73.71(a)(4)
	20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)
	20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER
	20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		
	20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)	X	50.73(a)(2)(i)(B)	X	50.73(a)(2)(vii)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)		
	20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)		

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Richard H. Blount, Site Vice President	(757) 365-2001

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER		SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	FK	FD	G080		BA	PSP		N
X	BA	JX	W893					

14. SUPPLEMENTAL REPORT EXPECTED			15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
	YES (If yes, complete 15. EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On May 21, 2004, at 2108 hours with Units 1 and 2 at 100% power, the Unit 2 main generator leads "A" phase Coupling Capacitor Voltage Transformer (CCVT) in the switchyard failed. The generator protective relays actuated, tripping the main generator, and resulting in trips of the turbine and reactor. Emergency systems functioned as required, including the Reactor Protection System (RPS) and Auxiliary Feedwater (AFW) System. A Notification of Unusual Event was declared related to the switchyard CCVT failure. Unit 2 was stabilized at hot shutdown. The cause of the CCVT failure was age-related degradation. The failed CCVT was replaced. On May 22, 2004, following refill of the Emergency Condensate Storage Tank, an unisolable leak in a buried Unit 2 AFW recirculation line was discovered. The AFW system was declared inoperable. Further evaluations determined that the AFW system was capable of performing its intended function. The cause of the AFW piping leak was external galvanic corrosion of the buried carbon steel piping due to the failed corrosion protection. The recirculation line was rerouted. There were no significant safety consequences associated with this event. The automatic actuations of the RPS and the AFW are reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A). The AFW leak is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(vii).

1.0 DESCRIPTION OF THE EVENT

On May 21, 2004, Units 1 and 2 at Surry Power Station were operating at 100% reactor power. At 1837 hours, a 500 kilo-Volt (kV) switchyard trouble annunciator alarm was received in the main control room due to abnormal potential indication on the 500 kV generator Unit 2 leads.

Investigations found no physical damage on the potential measurement devices and no indication of oil residue on the Unit 2 main generator leads Coupling Capacitor Voltage Transformers (CCVTs). CCVTs, also referred to as Coupling Capacitor Potential Devices, step down switchyard voltage to provide voltage indication to switchyard protective relays and remote indicators. Voltage measurements indicated a degrading trend on the main generator leads "A" phase CCVT.

At 2108 hours, during ongoing discussion concerning the need to take Unit 2 offline, the Unit 2 main generator leads "A" phase CCVT [EIIS: FD, FK] failed. The failure caused Unit 2 generator protective relays to actuate, tripping the main generator, and resulting in trips of the turbine and reactor. All three Auxiliary Feedwater (AFW) pumps [EIIS: P, BA] automatically started on low-low SG level as designed. The "C" SG AFW indicated no flow, but this was determined to be an indication only issue since wide range level in the associated SG was increasing at a rate comparable to the other two steam generators.

At 2109 hours, Security and Warehouse personnel notified the Main Control Room of an explosion and fire in the switchyard. At 2116 hours, the control room staff made a Notification of Unusual Event (NOUE) based on the "Confirmed report of unplanned explosion within Protected Area or Switchyard." The fire team responded and extinguished the last of the small fires in the switchyard by 2142 hours. After verification that no further explosive hazards existed, the NOUE was terminated at 2256 hours.

At 0028 hours on May 22, 2004, NRC notification was made in accordance with 10 CFR 50.72(b)(2)(iv)(B) for a 4-hour and 8-hour report due to automatic actuation of the Reactor Protection System (RPS) and AFW. This Licensee Event Report is provided pursuant to 10 CFR 50.73(a)(2)(iv)(A) for an event that resulted in automatic actuation of the Unit 2 RPS and AFW.

On May 22, 2004, with Unit 2 stabilized at hot shutdown (HSD), it was determined that a leak in an underground line was causing the Emergency Condensate Tank [EIIS: TK, BA] to lose inventory at approximately 7.5 gallons per minute. Further investigation confirmed that the location was in an underground lube oil cooler minimum recirculation line [EIIS: PSP, BA] common to all three Unit 2 AFW pumps. At 2130 hours, the AFW piping was declared inoperable and Unit 2 entered a 30-hour clock to cold shutdown (CSD). In addition, a 72-hour Unit 1 AFW cross-tie clock was entered. At 2229 hours, NRC

notification was conservatively made in accordance 10 CFR 50.72(b)(3)(v)(D) for a condition that could prevent fulfillment of a safety function needed for accident mitigation.

On May 23, 2004, at 2050 hours, Unit 2 reached CSD conditions, and exited the 30-hour clock to CSD.

This report is provided pursuant to 10 CFR 50.73(a)(2)(i)(B) for an operation or condition prohibited by the Technical Specifications for Unit 2, and 10 CFR 50.73(a)(2)(vii) for an event where a single cause or condition caused two independent trains to become inoperable in a single system designed to mitigate the consequences of an accident for Unit 2.

2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

This event resulted in no significant safety consequences or implications. The plant systems responded as required. Automatic actions occurred as designed, including main generator trip, turbine trip by generator breaker trip, reactor trip by turbine trip, auxiliary feedwater initiation, and actuation of anticipated transient without scram mitigation system actuation circuit. The Unit 2 generator output breakers promptly opened due to protective relay actuation from the generator leads.

The operating staff responded promptly and appropriately to stabilize the Unit 2 at hot shutdown, and the shift technical advisor monitored the critical safety function status trees to verify that satisfactory unit conditions were maintained.

On May 22, 2004, with the unit at hot shutdown, Unit 2 AFW piping was declared inoperable due to a leak in an underground lube oil cooler minimum flow recirculation line common to all three Unit 2 AFW pumps. The lube oil cooler minimum flow recirculation lines provides thermal protection for the AFW pumps. Further evaluation determined that the leak in the failed line would have been slightly greater than 8 gallons per minute with AFW pumps running. If the leak occurred when the AFW system was called upon to perform its function, sufficient volume was available to meet the accident analysis requirements even with the leakage. In addition, the cross-connect from Unit 1 would have provided sufficient flow, if needed.

Considering the AFW recirculation line leak and the switchyard fire, which did not result in a loss of offsite power to the station, a risk impact concluded that the conditional core damage and large early release risk impact was small (3.6E-7 and 6.5E-9, respectively). Therefore, the health and safety of the public were not considered to be affected.

3.0 CAUSE

The cause of the Unit 2 automatic reactor trip was the failure of the "A" phase CCVT in the switchyard. The failure caused the generator protective relays to sense a difference

in current between the Unit 2 "A" main transformer output and the Unit 2 "A" generator lead in the switchyard.

The cause of the CCVT failure was determined to be age-related degradation. The failed switchyard component was original equipment and had been in use for over 30 years.

The cause of the leaking AFW recirculation line was external galvanic corrosion of the buried carbon steel piping due to the failed corrosion protection. This piping was installed during initial construction with a corrosion protective coating consisting of a wrap of vinyl tape which was found to be ineffective in preventing ground water from contacting the outer surface of the AFW recirculation piping.

A second cause of the leaking AFW recirculation line was that a similar leak occurred in the Unit 1 AFW recirculation line on April 27, 1992. The actions taken as a result of this previous leak were primarily corrective and focused toward stopping the loss of water from the Unit 1 emergency condensate storage tank. No evidence could be found that the probable cause of recirculation line failure or the extent of condition on other buried lines was determined.

4.0 IMMEDIATE CORRECTIVE ACTION(S)

Unit 2 began stabilizing in hot shutdown at 2200 hours.

The "C" SG AFW flow indicator was found to have a blown fuse in the sealed module power supply [EIIS: JX, BA], and was returned to service following replacement of the power supply.

5.0 ADDITIONAL CORRECTIVE ACTIONS

All three Unit 2 generator lead CCVTs were replaced and more accurate alarming relays in parallel with the original relays were added.

A temporary modification was implemented to return one of the AFW pumps to service. The temporary modification allowed Unit 1 to exit the 72-hour AFW cross-tie clock. On May 25, 2004, a design change was implemented to reroute the lube oil cooler minimum recirculation line and return all three AFW pumps to service.

Excavation of the underground AFW lube oil cooler minimum recirculation line was initiated to determine, characterize, and repair the source of the leak. During excavation, several additional lines were unearthed and coating systems were inspected. Engineering evaluated the additional lines and determined that the integrity of the other piping will continue to be maintained.

6.0 ACTIONS TO PREVENT RECURRENCE

Critical CCVTs, which could cause a similar occurrence, were replaced for Unit 2. The critical CCVTs for Unit 1 will be replaced in the Fall 2004 refueling outage. Other switchyard CCVTs older than 20 years will be replaced and a monitoring and scheduled replacement program will be implemented to prevent future failures. An evaluation will be conducted to verify that switchyard critical components and appropriate preventive maintenance activities are identified.

The AFW recirculation lines on both units have been bypassed with piping which runs within a building and is therefore not subject to the environmental conditions which caused this pipe failure. An evaluation and/or inspection will be conducted of the coating systems applied to carbon steel and stainless steel risk significant piping which have not been previously evaluated.

Regarding the similar leak which occurred in the Unit 1 AFW recirculation line on April 27, 1992, the current corrective action program requires a complete and thorough cause analysis to be performed by the Root Cause Evaluation. Therefore, no additional corrective action was recommended due to significant improvements in the corrective action program which have been made over the last 12 years.

7.0 SIMILAR EVENTS

No similar event at Surry Power Station was found for the 500kV CCVT failure.

On February 10, 2001, during performance of a periodic AFW flow instrument channel check, "C" SG AFW flow indicator did not pass the test for AFW flow. The apparent cause evaluation determined that a Technipower sealed power supply module was degraded. The power supply module was replaced with a rebuilt spare module.

On April 27, 1992, a piping leak was identified in the Unit 1 AFW recirculation line. The corrective actions related to this leak were focused on bypassing the leaking line to stop the loss of water from the emergency condensate storage tank.

8.0 MANUFACTURER/MODEL NUMBER

General Electric model CD31B CCVT.
Technipower model 4111085001 power supply for flow indicator.
Schedule 40 carbon steel pipe (2 inch).

9.0 ADDITIONAL INFORMATION

On May 29, 2004, at 0623 hours, Unit 2 returned on line.